



## **Better Buildings Residential Network Peer Exchange Call Series:**

*All About DATA SPIKE: Benchmarking and Reporting  
Energy Efficiency in a Pandemic*

September 24, 2020

# Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers:
  - **Robin LeBaron**, Pearl Home Certification
  - **Charley Cormany**, Efficiency First California
  - **Greg Thomas**, Performance Systems Development
- Open Discussion
- Closing Poll and Announcements

## Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

*The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.*

# Better Buildings Residential Network

## Join the Network

### Member Benefits:

- Recognition in media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

### Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

### Upcoming Calls (2<sup>nd</sup> & 4<sup>th</sup> Thursdays):

- Oct 08: TRANSFORMATION: Technology that Can Change the Residential Energy Efficiency World
- Oct 22: Zero Energy Goals and Residential Energy Efficiency – How Are They Fitting Together?
- Nov 12: Conversations with Utility Commissions, Efficiency Programs, and Homeowners – Translating Building Science to the Real World

*Peer Exchange Call summaries are posted on the Better Buildings [website](#) a few weeks after the call*

*For more information or to join, for no cost, email [bbresidentialnetwork@ee.doe.gov](mailto:bbresidentialnetwork@ee.doe.gov), or go to [energy.gov/eere/bbrn](http://energy.gov/eere/bbrn) & click Join*



**Robin LeBaron**  
*Pearl Home Certification*

Welcome

# Pearl Certification:

*All About Data SPIKE  
A Presentation for the  
Better Buildings  
Network  
September 24, 2020*



# Data in the Time of COVID-19



- What are we collecting?
- How are we collecting it?
- What's changed?
- Why should you care?

# What is Pearl?



Founded to make the world  
a better place by giving  
homeowners tools to  
improve the health, comfort,  
efficiency, resilience and  
value of their homes

# The Challenge: Getting Energy Efficiency to Scale



~ 1 million  
HPwES  
whole-house  
upgrades in  
the past  
decade

70 million single-family homes need improvement

**700 years is too long!**



# What Pearl Does



Pearl makes energy efficient and renewable home features **visible** through certification



We work with the real estate sector to ensure that visibility is translated into **value** at time of sale or refinance





# What Data Do We Collect?

# Certifiable Home Assets



## Building Shell

Roof, walls, windows,  
and foundation



## Heating & Cooling

Furnace, AC, heat  
pumps, ductwork



## Baseload

Water heater,  
lighting, appliances



## Home Management

Smart devices,  
demand response,  
controls

## RENEWABLE ENERGY FEATURES

Solar panels, battery storage, EV charging, inverters



# Data Flavors



- Nameplate characteristics: AFUE, SEER, R-value, etc.
- Measurements: ACH50
- Installation quality indicators: properly designed and installed and/or performance tested
- Third-party certifications: Home Energy Score, HERS Index, ENERGY STAR
- *Consumption data and deemed savings coming...*

# Pearl Certification Levels



## ASSET

Single high-performing home feature like an efficient heat pump, water heater, or appliance



## SILVER

700 points

A Pearl Silver home typically has an IECC 2015-level building shell OR ENERGY STAR heating and cooling systems



## GOLD

825 points

A Pearl Silver home typically has IECC 2015-level building shell AND ENERGY STAR heating and cooling systems



## PLATINUM

975 points

A Pearl Platinum home typically has IECC 2015-level building shell and ENERGY STAR HVAC, plus efficient appliances, water heating, lighting, and smart devices and controls

# Features of the Pearl Certification Report

Highlights comparing the installation to the state average

## Special Performance Features of This Home

Information below based on California data from the National Renewable Energy Lab.



Gas Furnace :  
Top 1% of gas heated homes

This home's heating equipment is exceptional: not only is it very efficient, but it also has a verified Quality Installation to the highest industry standards. It will save the homeowner money during cold winter months while providing comfort.



Filters :  
Hospital-grade

The home's special air filter unit attracts and captures airborne particles and allergens, such as dust, pollen, and mold spores - promising healthier indoor air for residents. These filters are likely to be near true HEPA filters at controlling most airborne particles.

Details about installation

### HOME ASSET DETAILS

#### Heating and Cooling

##### Heating System



Type	Gas central furnace
AFUE	96
Quality Installation	Yes
Motor	Full ECM
Maintenance Schedule	Maintenance Contract
ENERGY STAR®	Yes
Manufacturer	Lennox
Model Number	EL196UH045XE36B*

Contractor logo

**PARKER**  
& SONS

Contractor  
Parker and Sons

Homeowner  
John Adams



## Special Service Professional Information

**PARKER**  
& SONS

Service Professional	Lennox Premier Dealer
Completed By	Parker and Sons
Credentials	NATE Certified Technician
Years in Business	46 years in business

**LENNOX**  
Premier Dealer™

Lennox Premier dealers must earn and maintain a high satisfaction rating among consumers. They have exclusive access to product, service, business, and customer service training designed to help them deliver a superior experience. Lennox Premier dealers also have access to exclusive offers and promotions. For more information, please visit <https://www.lennox.com/buyers-guide/why-buy-lennox/lennox-premier-dealers>

\*NATE is the nation's largest nonprofit certification organization for heating, ventilation, air conditioning and refrigeration (HVACR) technicians. NATE tests represent real-world working knowledge of HVACR systems and validate the professional competency of service and installation technicians.

# Pearl Home Investment Plan



## HOME INVESTMENT PLAN FOR

675 Basking Ridge Ln  
Huntingtown, MD 20639-3806

### WHAT IS THIS PLAN?

Understanding what's in your home and your options for improvements can be complicated — Pearl is here to help. A Pearl Home Investment Plan will give you guidance on your home and options for upgrading specific assets to increase your comfort, lower energy bills and improve indoor air quality.

- Main Street Home Solutions is a member of the Pearl Advantage Network which means they deliver superior customer service and they are approved to collect investment data to certify your home.
- This home investment plan will help you plan for short term and long term improvements to create a high-performing home.
- Each investment you make has the potential to increase your score making your home more comfortable and energy efficient — as well as valuable.

### PREPARED BY

Owen Owner  
(555) 555-5555  
wmurphy67+982635672@gmail.com  
<http://www.pearlcertification.com>

Co-branded with  
Contractor



## In This Report

### MAIN STREET HOME SOLUTIONS PACKAGE RECOMMENDATIONS

Home Solutions

Upgrades Include	Existing	High Efficiency Package	Quiet Comfort	Health and Smarts Package
<b>Heat Pump Systems 1</b>	HSPF: 7.80 SEER: 10.00	HSPF: 9.50 SEER: 15.00	HSPF: 10.00 SEER: 18.00	HSPF: 9.50 SEER: 15.00
<b>Health and Indoor Air Quality</b>				✓ See below for details
<b>Smart Home Devices</b>	✓ See below for details	✓ See below for details	✓ See below for details	✓ See below for details
<b>Potential Pearl Points</b>	628	669	707	703
<b>Potential Pearl Tier</b>	Certified Assets	Certified Assets	Silver	Silver

### WHAT MAKES A PEARL CONTRACTOR THE RIGHT CHOICE?

When you select a Pearl Advantage Contractor, you can have confidence you're working with a top-tier firm that will help you make the right improvements and does high-quality work. Contractors go through a rigorous

Underscores Market  
Differentiation

	Pearl Contractor	Other Firms
Independently certified?	✓	?
Follow quality installation guidelines?	✓	?
Issue documentation to capture the value of your home?	✓	✗
Prioritize customer service?	✓	?
Qualified to make recommendations to improve your home's comfort, indoor air quality, and energy efficiency?	✓	?

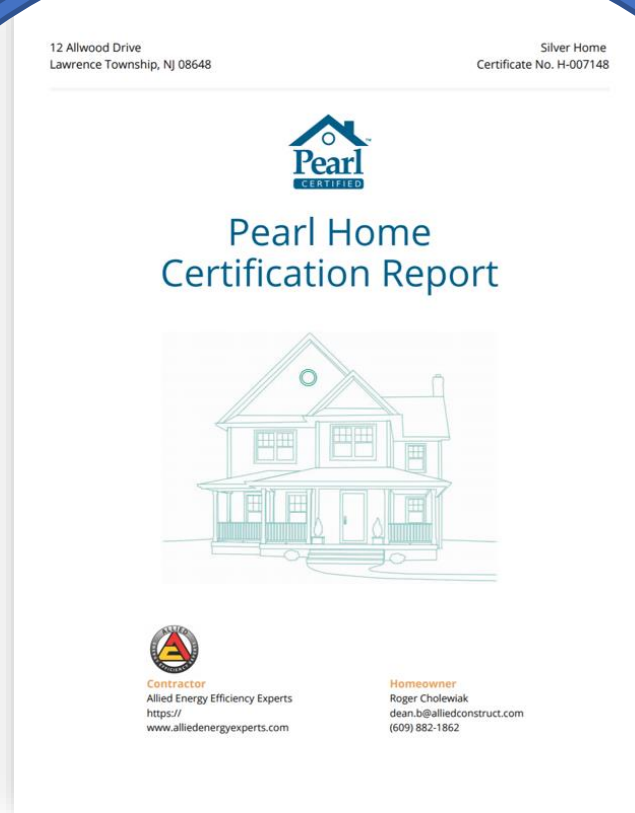


# Market Transformation Strategy

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Contractors:  
create *inventory*

Utilities and  
municipalities:  
*drive market  
transformation  
through education*

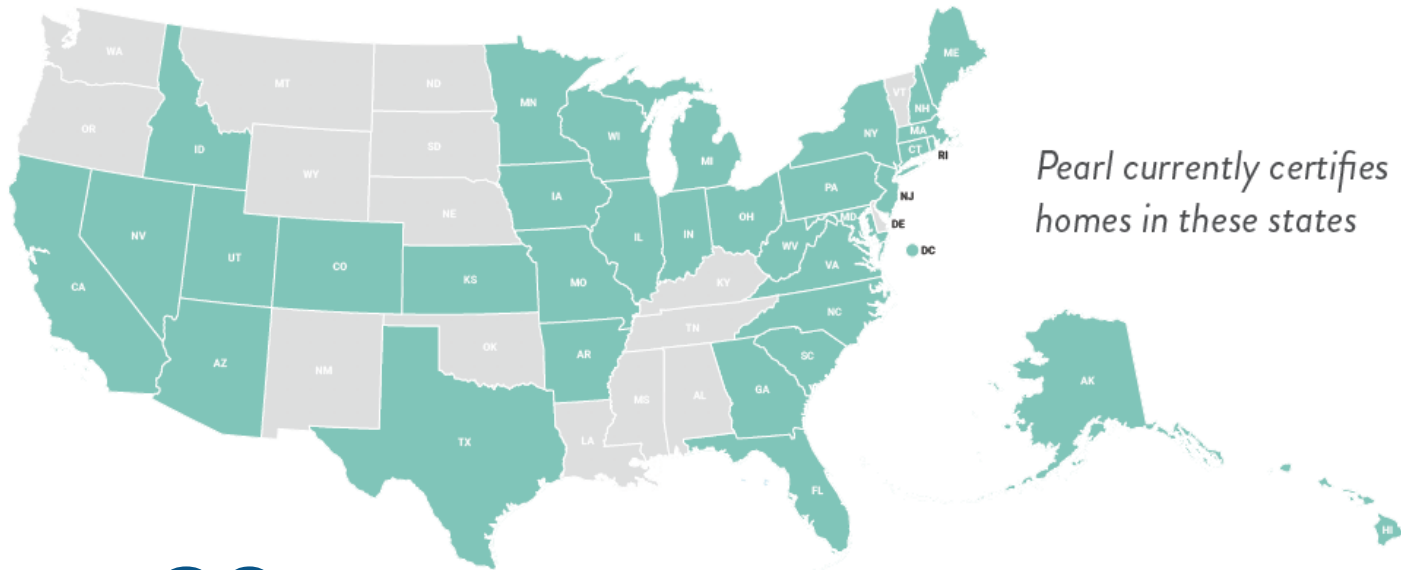


Real estate  
agents: *market  
certified homes*

Real estate  
industry: *increases  
certified homes'  
visibility*



# Pearl at age two-and-a-half



*Pearl currently certifies homes in these states*

## 83

High-Quality  
Contractors in  
network

## 26,000+

Homes certified



# The Data Pipeline

# Who gives us data?



- Contractors
- Builders
- Certifiers
- Home inspectors
- Programs
- Raters
- Homeowners

# What is the data set?



- Home features: Single-trade contractors, homeowners
- Whole-house inventory: Home performance contractors, certifications for real estate transaction

***We encourage, but don't require, a full home asset***

# What is the data pipeline



- Pearl certification app
- Data integrations & automations
- Typeforms
- Paper, faxes – and offshore assistance
- Green Door

# What does the data look like?



- Data according to our app / typeform specs
- HPXML
- Model numbers / nameplate efficiencies
- Stuff written on crayon on napkins (mostly kidding)

# Point at Home Lifecycle



- Build
- Improve
- Sale
- Preparing for sale
- Immediately post-sale
- Thinking about improvements



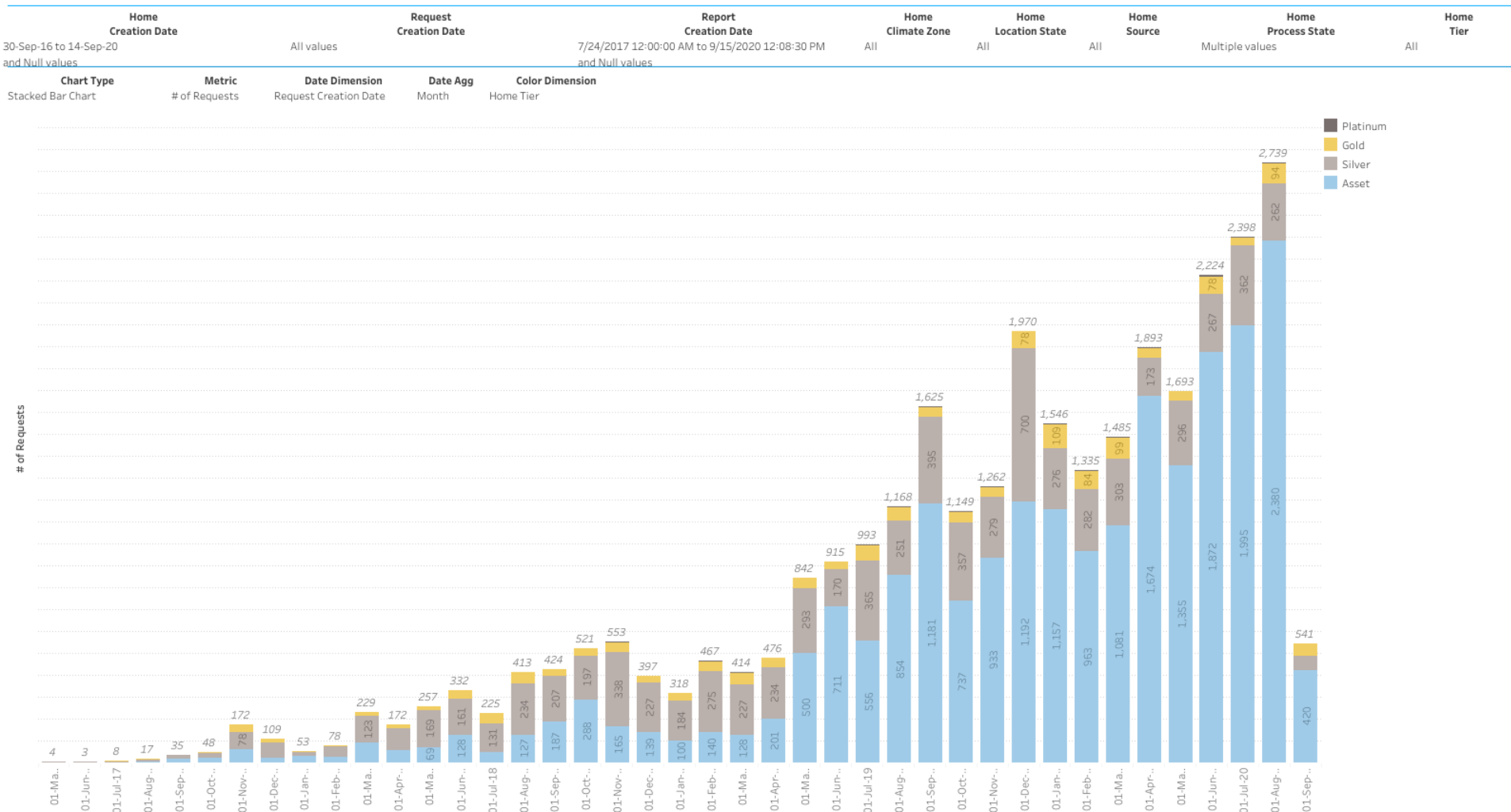
# Trends



# More data than ever before



## Trends Dashboard



# Contractors really busy



- HVAC couldn't keep up with demand over summer
- Solar maintaining pipelines
- Home performance slowed down: then picked up

# ”Remote” data collection for RE



- New products for agents: virtual certifications
- Now certifying simple data
- Piloting certification of more complex “home performance” data

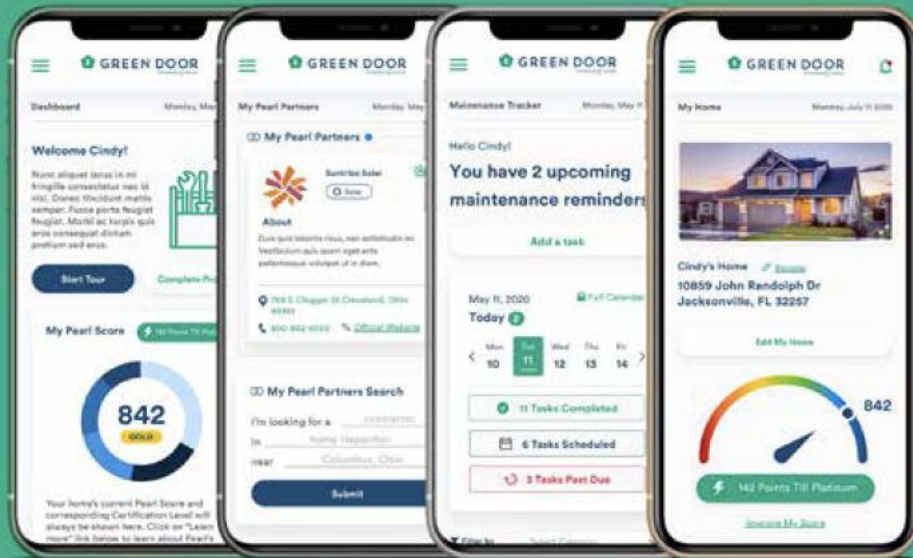
# Homeowner engagement



- New (in a systematic way) in 2020

# GREEN DOOR

POWERED *by* PEARL



**Pearl's consumer portal provides an interactive home record and suggested improvements tied to certification level**

- Educates homeowners on benefits of improvements
- Connects them to service professionals
- Increases brand loyalty and customer satisfaction

Welcome Cynthia!



My Pearl Score

134 Points Until Platinum!

Your home's current Pearl Score and corresponding Certification Level will always be shown here. Click on "Learn more" link below to learn about Pearl's scoring system. As you make improvements to your home, be sure to log them in this portal so we can recalculate your score update your Pearl Certification Report when you reach a higher level.

[Learn more about Pearl's scoring system](#)

Improve My Score

My Assets

Building Shell  
221 / 300 Points



Heating & Cooling  
207 / 360 Points



Baseload  
219 / 240 Points



Home Management  
194 / 300 Points



Solar, EV & Energy Storage



Manage My Home's Assets

Maintenance Tracker (Jul — Aug 2020)

View All Tasks



0 Completed

0 Scheduled

0 Past Due



Add your first task to get started!

[Add a task](#)

Need support?

Get Help



Thank You

Robin LeBaron, Co-Founder,  
President and COO  
[robin@pearlcertification.com](mailto:robin@pearlcertification.com)



**Charley Cormany**  
*Efficiency First California*





## **Contracting During a Pandemic**

**Adapting to the new challenges created by COVID-19**

**Presented by: Charley Cormany**

Executive Director – EFCA



# Introduction

- Your presenter - Charley Cormany – Current EFCA Executive Director. Former Home Performance Contractor. Over fifteen years in the industry
- Efficiency First California is a non-profit trade organization that represents Energy Efficiency and Decarbonization contractors in California
- EFCA is also Program Administrator for Sacramento's Municipal Utility District (SMUD). We manage their residential rebate programs
- One of our contract responsibilities is field quality control inspections



# EE Contracting and COVID-19

One of the new challenges is how do we get the information we need with minimum impact to the homeowners?

**Two main concepts:**

- Gathering as much data as possible without entering the home
- Adopt new protocols when you must go into homes

# Off-site data collection

Leveraging data from other sources

**Utilize public domain information as much as possible**

Mine data from real estate information sites such as:

- *Zillow*
- *Redfin*

You can get tons of data from these resources about the home. The problem is it is not always accurate.

**Utility bill data**

- Analyze energy data use through “*Green Button*” and other utility bill data tools

# Remote data collection

Remote data collection – have someone on site help gather data

## Use the homeowner help gather information

- Using the home owner as the eyes of the contractor.
- As simple as using a smartphone video application (e.g. *Facetime*) to gather information.
- You guide the home owner through the inspection to get the information you need
- Having them involved in the process helps

# Remote data collection

## Utilize new specialty software

**New software solutions can make this much more effective**

### *Clear Result Virtual Assessment tool*

- Remote energy advisor guided inspection
- Laser pointer - allows consultant to point to specific areas
- Optical character reader – reads equipment tags
- Directed by energy consultant over the phone – interactive

## **CDC compliance software**

### *CertiClear*

- Employees log in daily and answer questions
- Provide record of compliance

# On-site data collection

How to safe and protect your customers and workers

## **Follow CDC protocols – basic prevention ideas**

- Wear an N-95 mask – cloth is not enough
- Practice social distancing – 6 feet matters
- Clean everything – use disinfectant wipes
- Washable booties – use clean pair each time
- Use tarps and wash them
- Only bring in what you need

## **Using IR as a temperature check**

- Auditor takes IR selfies prior to entering the home

# On-site data collection

How to safe and protect your customers and workers

## Pre-flush home if using a blower door

- Open windows and door and use blower door to “flush” the home with outside air
- Dilution is the solution

## Minimize your time inside

- Be tactful and minimize your time in the home
- Be smart, plan ahead, protect yourself and the occupants

## Communication counts

- We are finding people to be apprehensive but receptive once we describe our protection protocols



# Need more information or have a comment? Let us know.

Charley Cormany, Executive Director  
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Phone: (916) 384-0324  
[info@efficiencyfirstca.org](mailto:info@efficiencyfirstca.org)

[www.EfficiencyFirstCa.org](http://www.EfficiencyFirstCa.org)





***Greg Thomas***  
***Performance Systems Development***



# Load Reduction at Scale in a Pandemic

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**Greg Thomas**  
**Performance Systems Development**

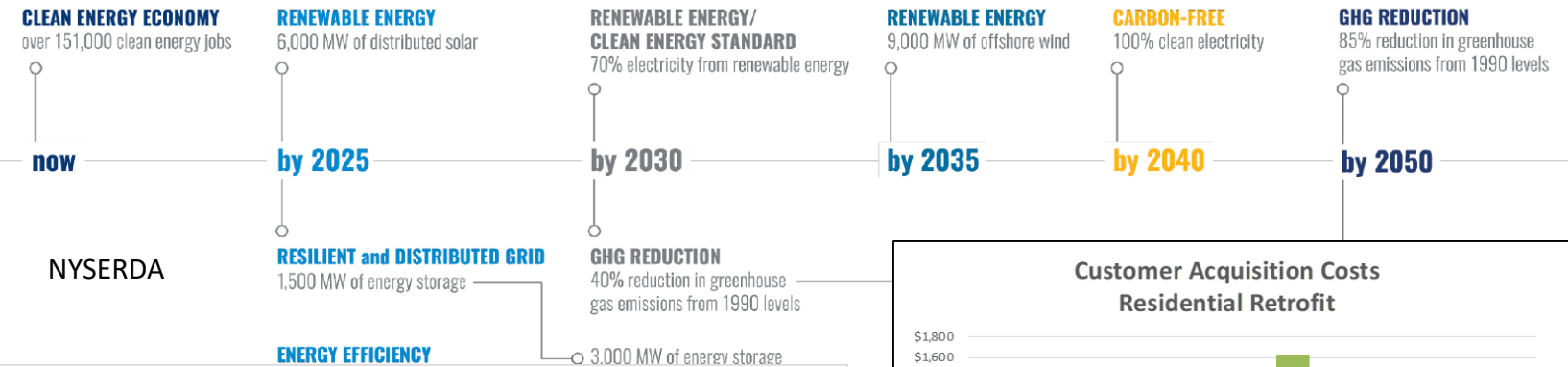
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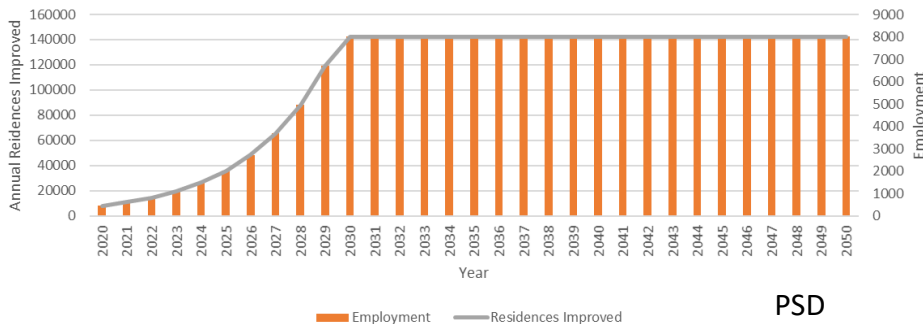
# BIG GOALS CALL FOR BIG SOLUTIONS



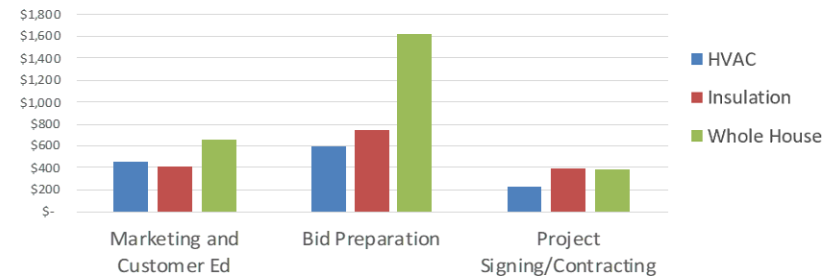
## New York State Clean Energy Goals Climate Leadership and Community Protection Act (CLCPA)



Required Annual Envelope Employment Growth



Customer Acquisition Costs  
Residential Retrofit



### Lean and Agile Solutions are Needed

Comprehensive approaches come with high soft costs. We need a wider range of options.

NYISERDA

## WHAT DO WE NEED FOR EFFICIENCY TO SUPPORT THIS EFFORT?

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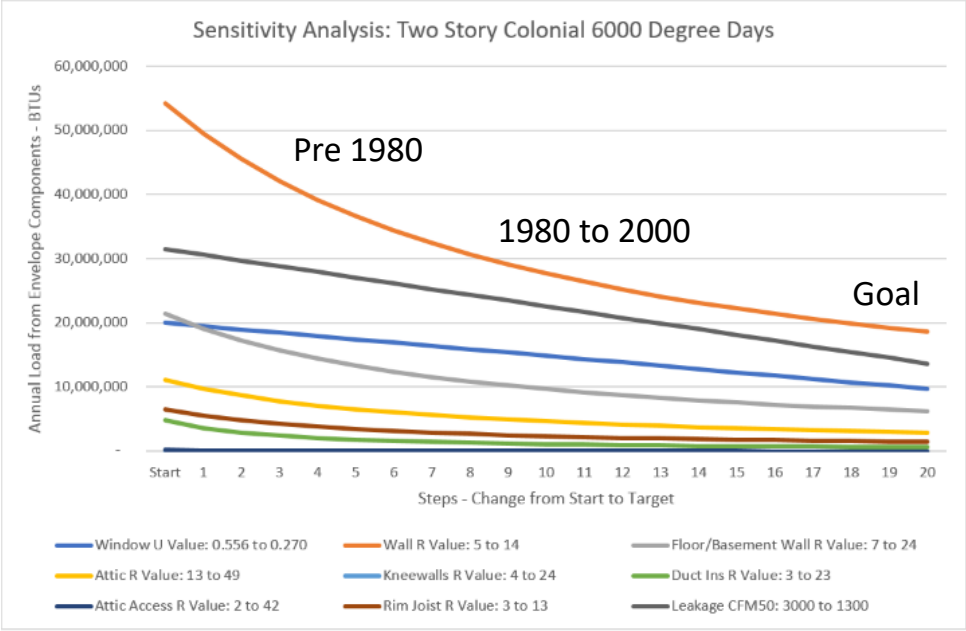
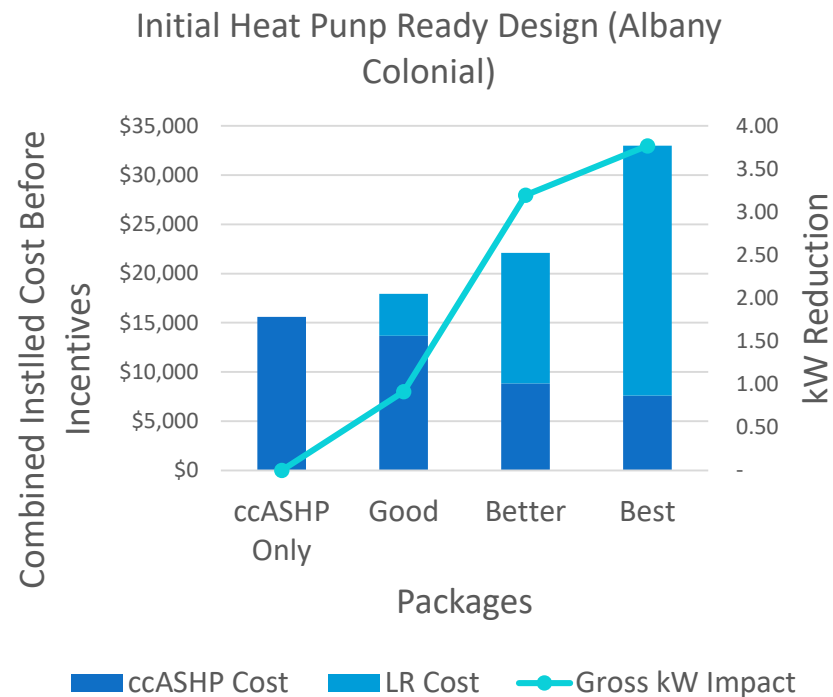


***We need to reduce the cost and increase the impact of energy efficiency:***

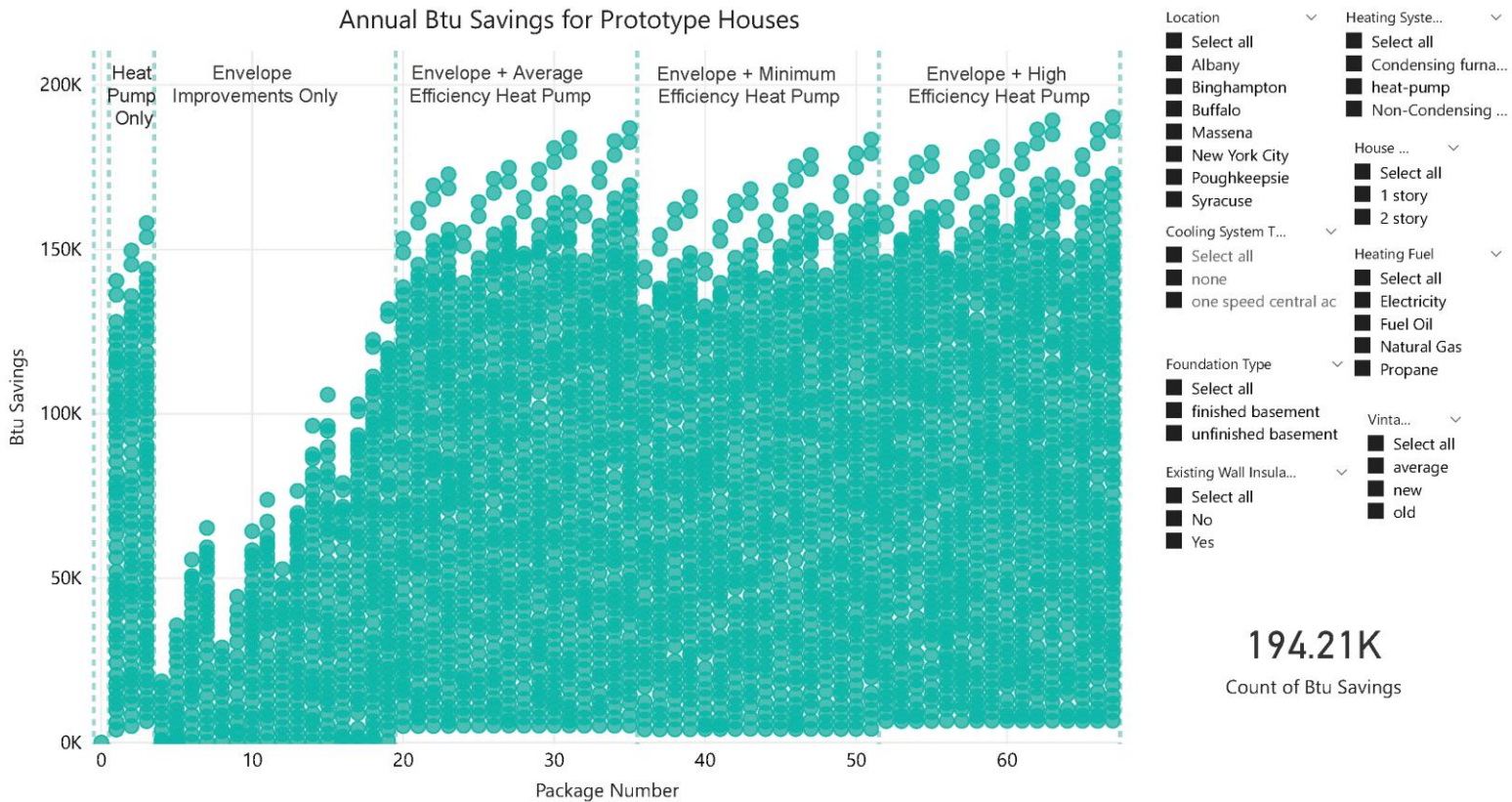
- ***Transaction costs*** for energy efficiency ***are increased*** by lack of data standardization and data silos (government vs utility, for example)
- Current methods of calculating predicted savings for utility programs make it ***expensive and difficult to introduce new technologies to TRMs forcing use of expensive bespoke energy modeling***
- Regulated ***efficiency*** investment needs to ***cost effectively generate meaningful results that contribute to grid management*** in order to value grid management as a benefit of efficiency

**And then the pandemic hit....**

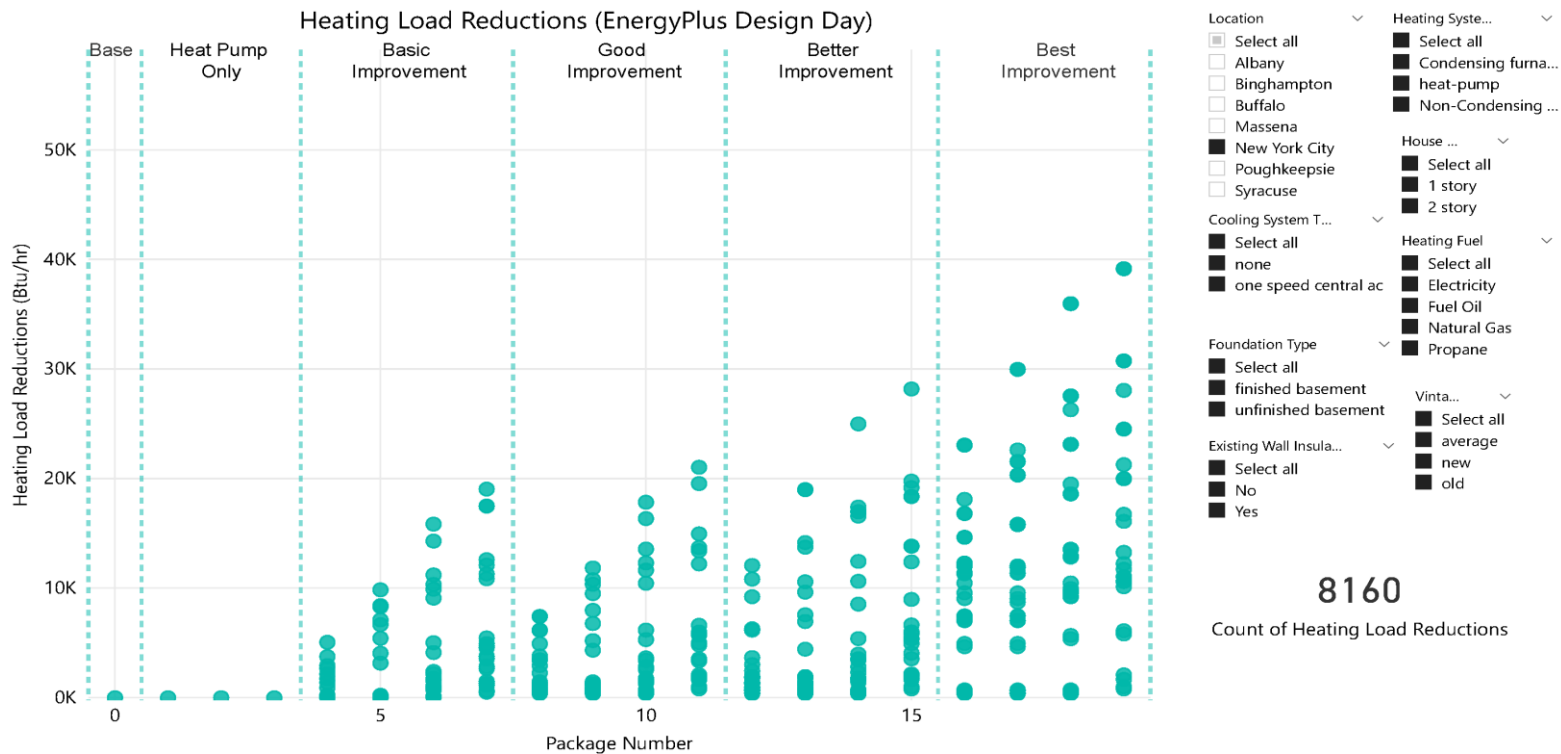
# GETTING HOMES HEAT PUMP READY



# STATEWIDE PROTOTYPE ANALYSIS



# SAMPLE NYC HEATING DESIGN DAY LOAD REDUCTION FOR PROTOTYPE BUILDINGS





# COMFORT HOME BASIC BUILDING DATA ENTRY



Existing House

Estimated Construction Era: 1950s  
Conditioned Floor Area: 2000  
Building Type: Ranch (1 story)  
Number of Stories: 1  
Average Story height (ft): 8  
Number of Bedrooms: 2  
Foundation Type: Unvented Crawl/Space

Existing Envelope

Blower Door CFM50: 3000  
Estimated Air Leakage: Estimated - Leaky  
Estimated Attic Insulation Level: Between R11 and R38  
Attic Insulation Grade: < 10% Voids or Compression  
Floor Insulation Level: Partially Insulated  
Wall Cavity Insulation Level: Unfilled Cavity or Plank  
Wall Cavity Depth: 2x4  
Rim/Band Insulation Level: Partially Insulated  
Window Glazing Type: Double-pane, clear

Existing Systems

Primary Heating Fuel: Electricity  
Primary Heating Type: Electric Baseboard  
Primary Heating System Age: 1980s  
Secondary Heating Fuel: None  
Primary Cooling Type: None  
Primary Cooling System Age: Select ...  
Hot Water Fuel: Electricity  
System Zoned (Y/N): No  
Thermostat Schedule: Nightly and W

Existing Fuel Usage

Estimated Annual Electricity Cost (\$): 3000.00  
Other Fuel 1: Select ...  
Estimated Annual Other Fuel 1 Cost (\$):  
Other Fuel 2: Select ...  
Estimated Annual Other Fuel 2 Cost (\$):

Then add improvements:

Good: Air Sealing, Attic, Ducts, Rim Joist

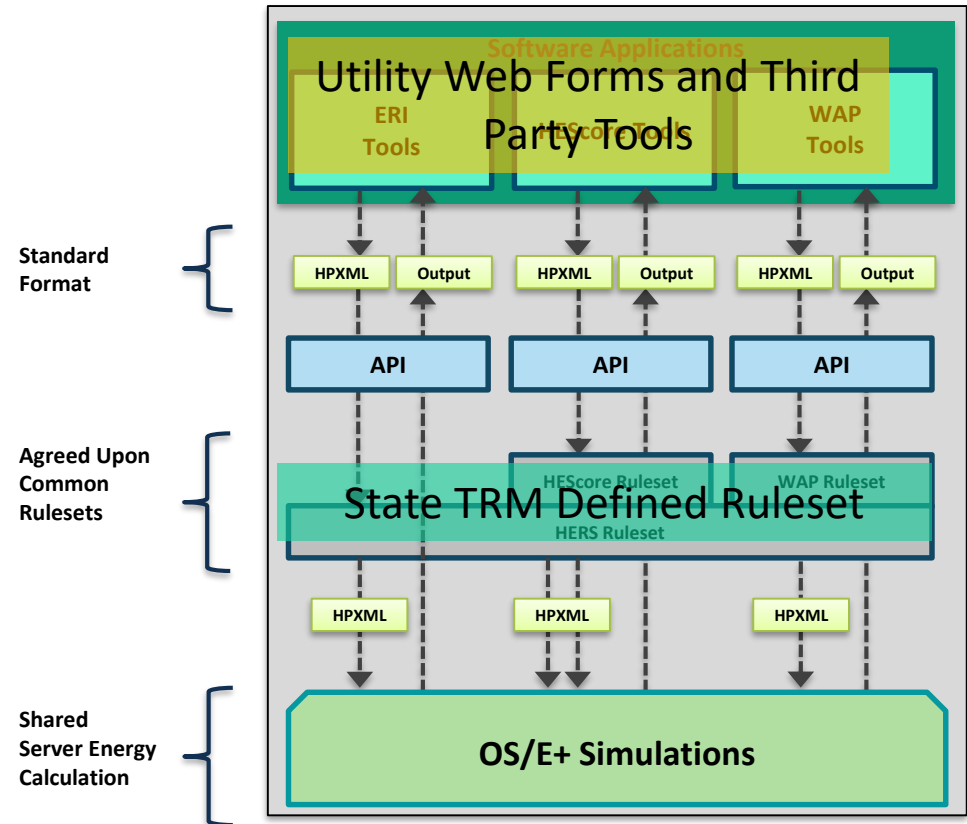
Better: Good Plus Walls and Floors

Best: Best Plus Windows

# ENERGYPLUS AUTOMATION USING STANDARDIZED DATA



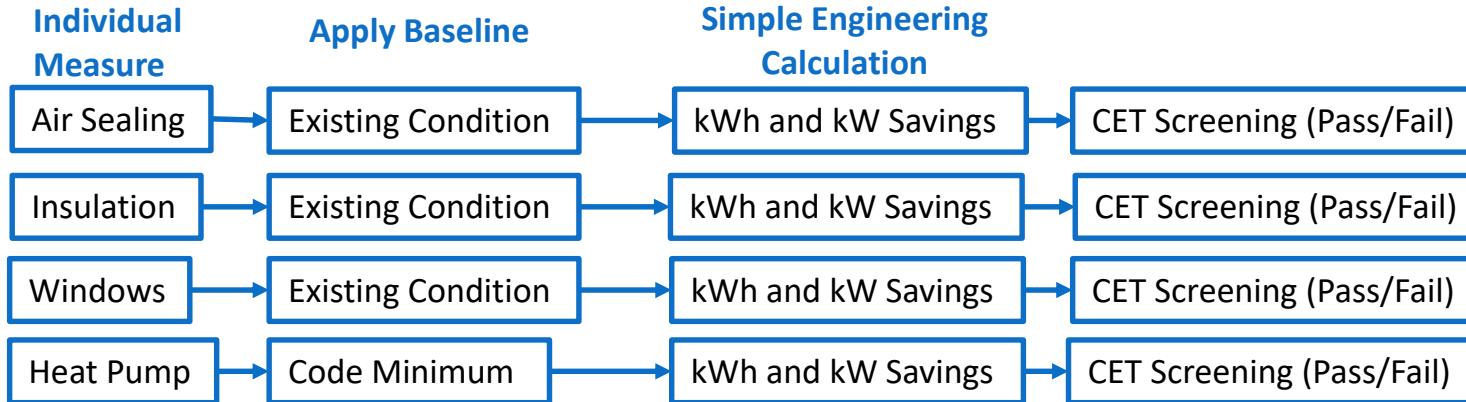
- Internal investment in DOE tools using this infrastructure that can be leveraged
  - Energy Rating Index
  - Home Energy Score
  - DOE WAP (New NEAT engine)
  - Commercial Building Asset Score
- DOE SBIR Award to PSD  
**“Supercharging Standardized Asset Data using EnergyPlus”**
  - NYSERDA as partner
  - Manual J Credentialing



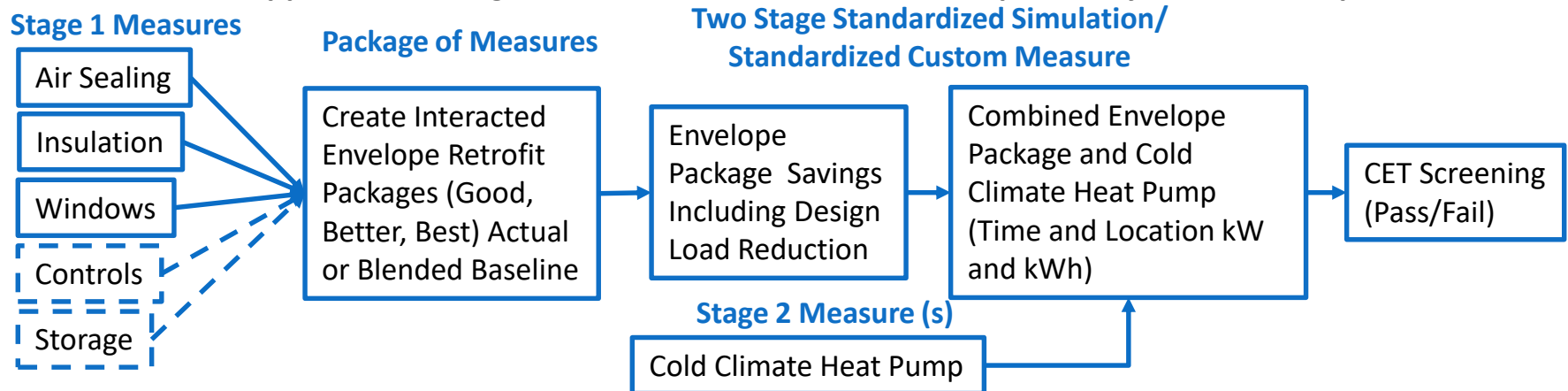
# TRADITIONAL TRM EQUATIONS VS STANDARDIZED SIMULATION



## Typical Partially Deemed TRM Approach: Measure Level Savings and Cost Effectiveness Testing (CET)



## Comfort Home Approach: Package Level Cost Effectiveness with Dependency on Heat Pump Install



# BUILDING A VALIDATION FRAMEWORK TO SUPPORT TRM SUBMISSION



AAA307

First Site

FloorArea

First Variable

Variation

2000

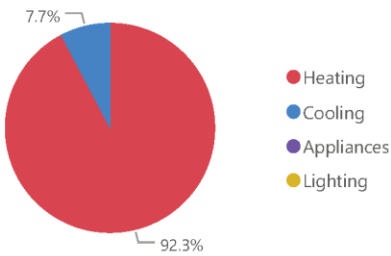
Package

Best

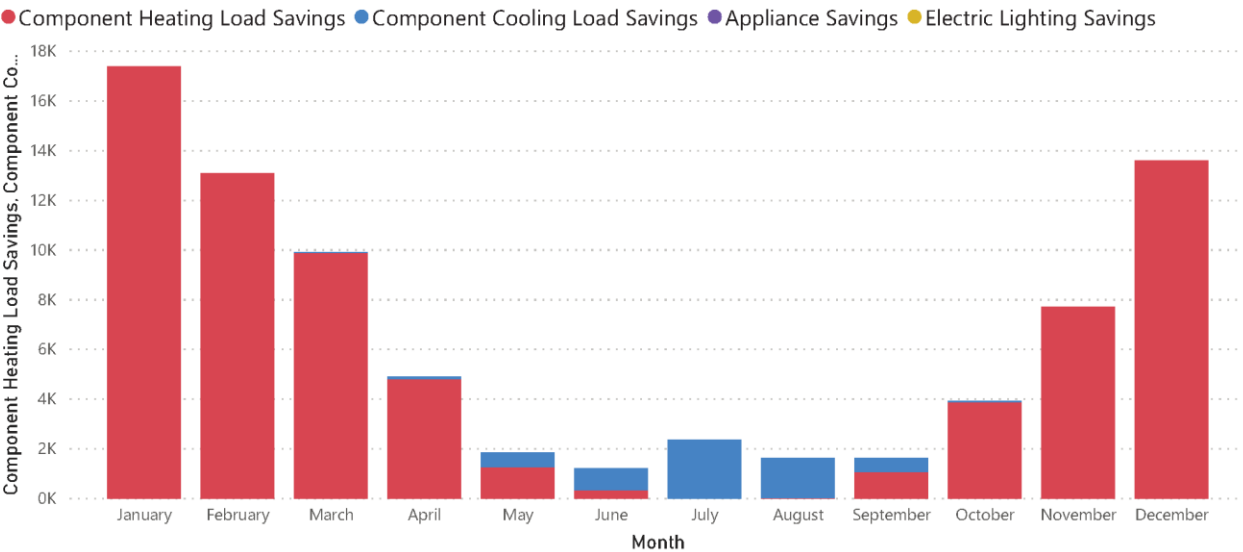
79.24K

Total Load Savings (kBtu)

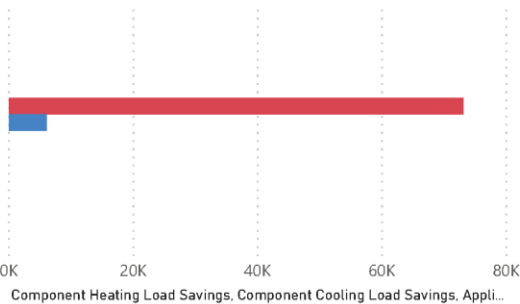
Composition of Component Load Savings



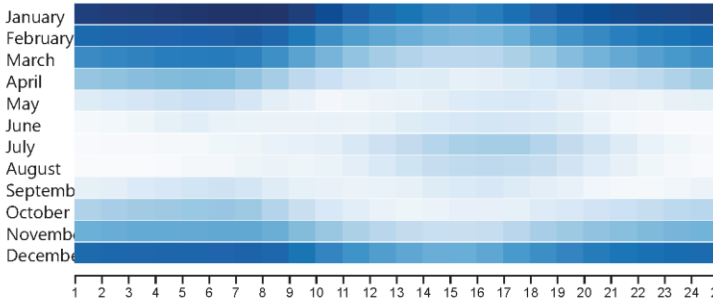
Component Heating Load Savings, Component Cooling Load Savings, Appliance Savings and Electric Lighting Savings by Month



Comparison of Component Load Savings



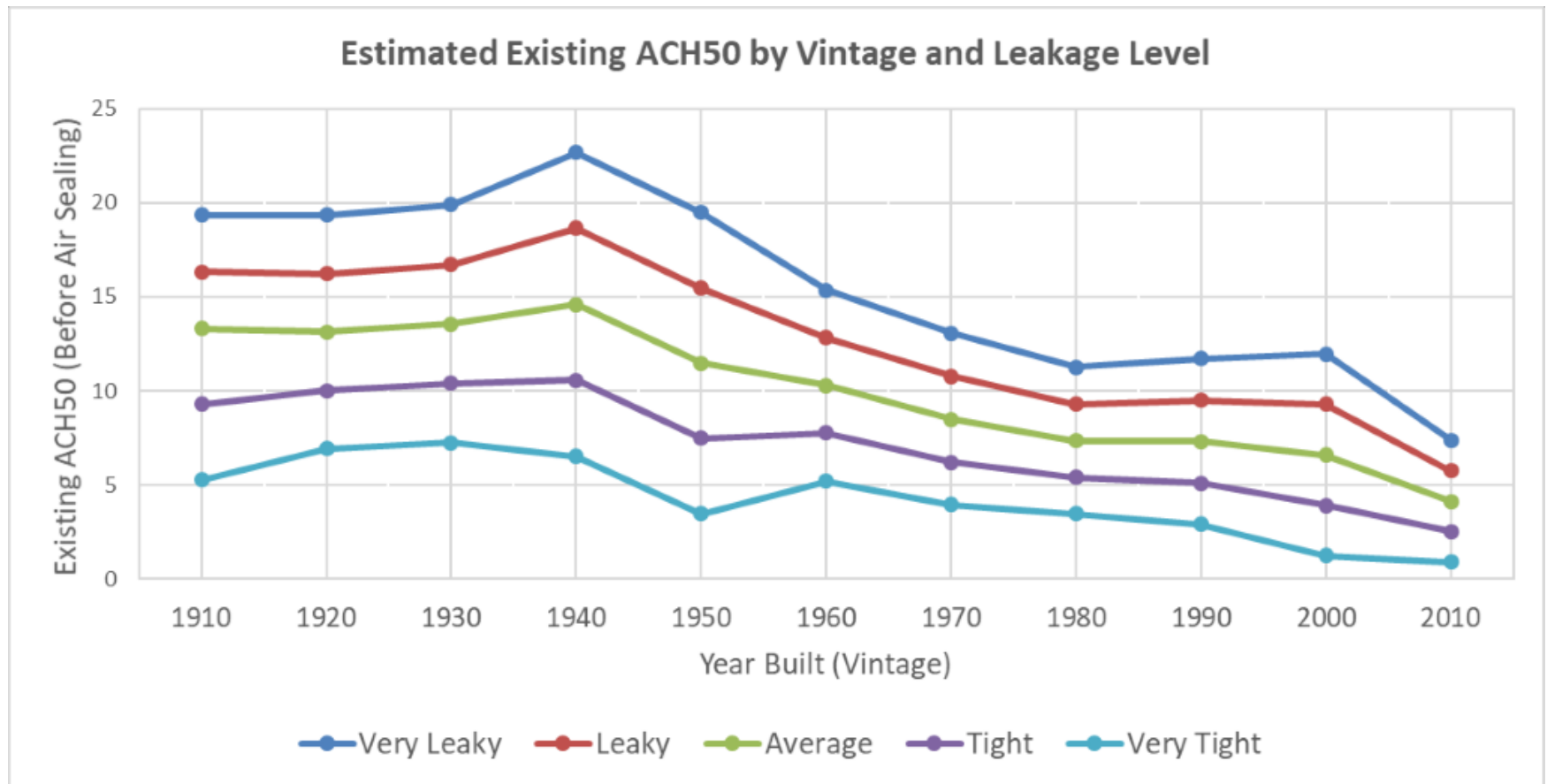
Total Load Savings (kBtu) by Month and Time Hourly



# WHAT REPLACES THE BLOWER DOOR?????



- Statewide 2019 Residential Building Stock Assessment included standardized blower door testing link to building vintage



# ESTIMATING INITIAL LEAKAGE AND SAVINGS POTENTIAL



## Setting the Leakage Level

### ■ Observe

- Additions and drop ceilings
- Balloon framing
- Soffits over kitchen cabinets
- Basement leakage to exterior
- Rooms over garages
- Cantilevered floors
- Kneewalls

### ■ Ask

- Drafts
- Ice dams
- Dust webs and Soot trails

### ■ Confirm

- Open chases
- Isolated returns and supplies
- Discolored batt insulation

## Estimating Reductions

Air Leakage Reduction Per centage by Package	Starting Reduction	Component improved by more than 66%	Component improved by 66% to 33%
Good Air Sealing, Attic and Rim Joist	20%		
Better Walls		plus 6%	plus 3%
Better Floors		Plus 3%	Plus 1%
Best Windows		Plus 2%	Plus 1%



# THANK YOU

Greg Thomas  
Performance Systems Development  
[gthomas@psdconsulting.com](mailto:gthomas@psdconsulting.com)

# New Virtual Sessions from Solar Decathlon on Innovative Homes and Energy Careers

The Solar Decathlon announced a new webinar series starting in September that will include virtual tours of innovatively designed homes and address a variety of topics from the rise in zero energy homes to clean energy careers.



U.S. DEPARTMENT OF ENERGY

**SOLAR DECATHLON**



# New Virtual Sessions from Solar Decathlon on Innovative Homes and Energy Careers

- **Solar 101 – How Solar Energy Works**  
Wednesday, September 16, 2020, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Discovering Clean Energy Careers**  
Wednesday, October 14, 2020, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **A Virtual Hands-On Energy Workshop for Families**  
Wednesday, November 18, 2020, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Solar Student Leaders of Tomorrow Showcase**  
Wednesday, December 16, 2020, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Resilient Home 411: Strategies to Weather and Recover from Natural Disasters**  
Wednesday, January 20, 2021, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Zero Energy Ready Homes: New and Growing Fast**  
Wednesday, February 17, 2021, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **The Future of Solar: A Tour of Cutting-Edge Solar Research with the U.S. Department of Energy**  
Wednesday, March 17, 2021, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Solar Decathlon Build Challenge Team House Tour**  
Friday, April 16, 2021, 1–2 p.m. E.T.  
Learn more about this webinar and [register here](#)
- **Winning Solar Home - The DOE Solar Decathlon Build Challenge Winners**  
Wednesday, May 19, 2021, 1-2 p.m. E.T.  
Learn more about this webinar and [register here](#)

# Explore the Residential Program Solution Center

Resources to help improve your program and reach energy efficiency targets:

- [Handbooks](#) - explain *why* and *how* to implement specific stages of a program.
- [Quick Answers](#) - provide answers and resources for common questions.
- [Proven Practices](#) posts - include lessons learned, examples, and helpful tips from successful programs.
- [Technology Solutions](#) **NEW!** - present resources on advanced technologies, **HVAC & Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.



<https://rpssc.energy.gov>

# Thank You!

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Please send any follow-up questions  
or future call topic ideas to:  
[bbresidentialnetwork@ee.doe.gov](mailto:bbresidentialnetwork@ee.doe.gov)